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THE THELEPHORACEAE OF NORTH AMERICA. XI<sup>1</sup>

TULASNELLA, VELUTICEPS, MYCOBONIA, EPITHELE, and  
LACHNOCLADIUM

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## TULASNELLA

*Tulasnella* Schroeter, Krypt.-Fl. Schlesien 3: 397. 1888; Juel, K. Svenska Vet.-Akad. Bihang till Handl. Afd. III. 23<sup>12</sup>: 21. 1897; Arkiv för Bot. 14<sup>1</sup>: 8. 1915; Sacc. Syll. Fung. 14: 234. 1899.—*Prototremella* Patouillard, Jour. de Bot. 2: 267. 1888.—*Pachysterigma* Johan-Olsen in Brefeld, Untersuch. Myk. 8: 5. 1889; Engl. & Prantl, Nat. Pflanzenfam. (1: 1\*\*): 117. 1898.

Fungi with the aspect of *Corticium* and with simple ovoid to globose basidia but having very large sterigmata, each of which bears a spore.

The organs which have the position of sterigmata—and are so called in the original definition of *Tulasnella* which I have followed—are different from all other sterigmata which I have seen by their spore-like form and greatly constricted connection with the body of the basidium as compared with the diameter of the rest of the sterigma. These organs resemble usual sterigmata in being permanently attached to their basidia. Juel, *loc. cit.*, gives cytological reasons for regarding these organs as basidiospores rather than as sterigmata, but basidiospores not sep-

<sup>1</sup> Issued March 2, 1920.

arable at maturity from the basidia which produce them are not known elsewhere in *Basidiomycetes*, so far as I am aware. Juel's material for cytological study proved to be the hymenium of a *Poria* infested by two species of *Tulasnella*. For the present, it seems less confusing in a taxonomic paper to refer to the spore-shaped organs permanently attached to the basidia in species of *Tulasnella* as sterigmata.

The specimens of *Tulasnella* which I have seen in vegetative condition were slightly colored in such colors as livid pink, dull lavender, and ecru-drab of Ridgway; specimens of all species fade to pale olive-gray in the herbarium. The spores were colored in the mass like the fructifications from which they were obtained in the cases where I secured spore falls on glass from specimens of my collection, but are hyaline under high magnification with the microscope. The fructifications are not adnate, as this term is applied to *Peniophora cinerea*, but merely very thin and tender, for when they are moistened small portions sufficiently large for crushing under a cover glass may be lifted clean from the substratum with the point of a scalpel. Such portions spread out well under the cover glass upon application of pressure and are very satisfactory for observation of the spores and sterigmata.

The species of *Tulasnella* are so similar in aspect that one has to rely upon microscopic details—chiefly of the spores and sterigmata—for recognition of the species. Nineteen species of *Tulasnella* are listed for Europe, but upon such slight differences in dimensions of the spores that it seems probable that the number will be materially reduced when a revision can be made upon the basis of first-hand knowledge of these species.

*Tulasnella* has been collected in North America in northern United States and Canada only; these gatherings are arranged in three species.

#### KEY TO THE SPECIES

- Spores subglobose,  $3\frac{1}{2}$ –6  $\times$  3–4  $\mu$  . . . . . 1. *T. Eichleriana*  
 Spores subglobose, 5–9  $\times$  4 $\frac{1}{2}$ –6  $\mu$  . . . . . 2. *T. violea*  
 Spores more elongated, 10–15  $\times$  3–5  $\mu$  . . . . . 3. *T. fusco-violacea*

1. *Tulasnella Eichleriana* Bresadola, Ann. Myc. 1: 113. 1903; Sacc. Syll. Fung. 17: 209. 1905; Bourdot & Galzin, Soc. Myc. Fr. Bul. 25: 32. 1909; Juel, Arkiv för Bot. 14<sup>1</sup>: 8. 1915.

Fructification effused, thin, pale lilac, finally fading to olive-buff; in structure 20–60  $\mu$  thick, composed of interwoven, hyaline hyphae 3  $\mu$  in diameter; sterigmata 7–10  $\times$  3½–4½  $\mu$ ; spores hyaline, even, 3½–6  $\times$  3–4  $\mu$ .

Fructifications 3–6  $\times$  1–1½ cm.

On rotting wood and bark of frondose species, rarely on coniferous substrata. Canada, New Hampshire, New York, Idaho, and Washington. July to November.



Fig. 1. *T. Eichleriana*. Young basidium, *a*, beginning formation of sterigmata; older basidium, *b*, having full-grown sterigmata; collapsed basidium, *c*, with spore attached to one sterigma; sterigma, *d*, bearing a spore; spores, *s*; hypha, *h*.  $\times$  870.

*T. Eichleriana* is noteworthy by having the smallest spores and sterigmata which are known in the genus. In these details American collections agree so closely with those of European specimens of *T. Eichleriana* that one can hardly doubt their being this species although authentic specimens have not been at hand for verification.

Specimens examined:

Canada: *J. Macoun*, 21.

Ontario: Ottawa, *J. Macoun*, 13.

New Hampshire: Chocorua, *W. G. Farlow*, 1, 4, 6\*\*, and two unnumbered specimens (the last three specimens in Mo. Bot. Gard. Herb., 55270, 55276, and 55597), and Nos. A and C (in Farlow Herb.).

Massachusetts: Sharon, *A. P. D. Piguet, B, E* (in Farlow Herb.).  
New York: Ithaca, comm. by G. F. Atkinson, 2817.

Idaho: Priest River, *J. R. Weir, 391* (in Mo. Bot. Gard. Herb.,  
15657).

Washington: Chehalis *C. J. Humphrey, 6284*.

2. *T. violea* (Quelet) Bourdot & Galzin, Soc. Myc. Fr. Bul.  
25: 31. 1909.

*Hypochnus violeus* Quelet, Ass. Fr. Av. Sci. 1882: 401. 1883.  
—*Prototremella Tulasnei* Patouillard, Jour. de Bot. 2: 270.  
*text f. 1-3*. 1888; Essai Taxon. Hym. 27. *text f. 19*. 1900;  
Sacc. Syll. Fung. 9: 236. 1891.—*Tulasnella Tulasnei* (Patouil-  
lard) Juel, K. Svenska Vet.-Akad. Bihang till Handl. Afd. III.  
23<sup>12</sup>: 21. 1897; Arkiv för Bot. 14<sup>1</sup>: 8. 1915; Sacc. Syll. Fung.  
14: 234. 1899; Bresadola, Ann. Myc. 1: 114. 1903.—*T.*  
*incarnata* Bourdot & Galzin, Soc. Myc. Fr. Bul. 25: 31. 1909.—  
An *Corticium incarnatum* var. *pinicolum* Tulasne, Ann. Sci. Nat.  
Bot. V. 15: 227. *pl. 10. f. 3-5*. 1872?—Not *Pachysterigmata*  
*incarnata* Johan-Olsen in Brefeld, Untersuch. Myk. 8: 7.  
*pl. 1. f. 1-2*. 1889.—Not *Corticium roseolum* Karsten, Soc.  
pro Fauna et Fl. Fenn. Meddel. 16: 2. 1888.

Illustrations: Patouillard, *loc. cit.*

Type: specimens determined by Quelet in Bourdot Herb.  
and a fragment in Burt Herb.

Fructification effused, thin, livid pink to dull lavender, fading  
in the herbarium to olive-buff; in structure 30–70  $\mu$  thick, com-  
posed of interwoven hyaline hyphae 3  $\mu$  in diameter; sterigmata  
7–10  $\times$  5–6  $\mu$ , with the main portion nearly spherical; spores  
subglobose, even, 5–9  $\times$  4½–6  $\mu$ .

Fructifications 1½–6 cm. long, 1–3 cm. broad.

On wood and fallen branches of frondose species, rarely on  
pine. New England, New York, and Washington. March  
to November.

This species is distinguished from *T. Eichleriana* by larger  
spores and sterigmata. The spores are usually about 6  $\times$  5  $\mu$ ,  
with a slight point of attachment at the base; the body portion  
of the sterigma has about the same dimensions as the spores.  
The fructifications are too thin and tender to permit of large

portions being separated from the substratum, but they are not adnate, for upon moistening the fructification small portions large enough for preparation under a cover glass may be lifted from the substratum with the point of a scalpel.

It seems probable that *Corticium incarnatum* var. *pinicolum* Tul. must have been either the present species or *T. Eichleriana*, on account of the subglobose spores which the Tulasnes figured, although unfortunately without stating spore dimensions or scale of magnification of their figures.

Von Höhnel & Litschauer have published<sup>1</sup> that *Corticium roseolum* Karst. is the same species as *Tulasnella Tulasnei*. I have studied an authentic specimen of *C. roseolum* communicated to me by Karsten; this species is not distinguishable in

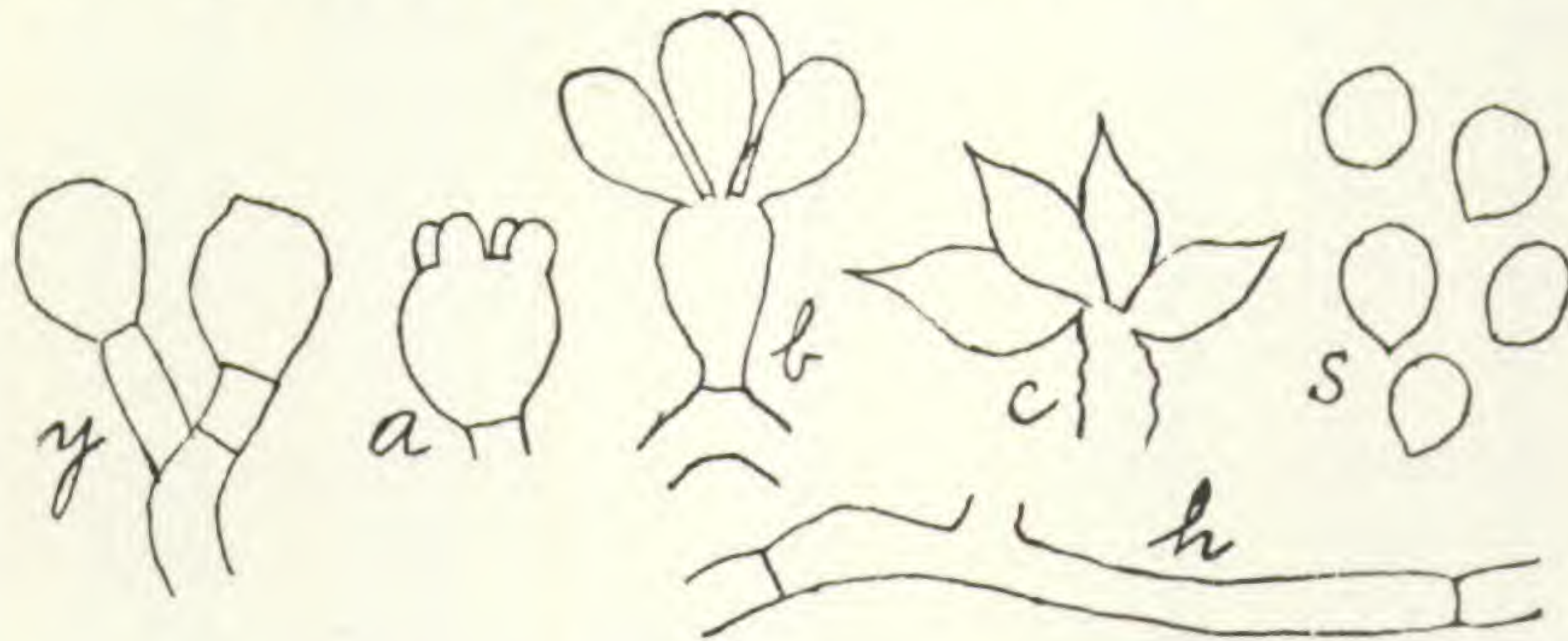


Fig. 2. *T. violea*. Young basidium, *y*; young basidium, *a*, forming sterigmata; basidium, *b*, with nearly full-grown sterigmata; old, collapsed basidium, *c*, from whose sterigmata the spores have fallen; spores, *s*.  $\times 870$ . From specimen determined by Quelet.

coloration and aspect from several sendings of *T. Tulasnei* (= *T. violea*), also on *Betula*, received from Romell and cited below, but it is entirely different in microscopic characters. This specimen of *C. roseolum* agrees well with the description published by Karsten; its spores are hyaline, even,  $4-6 \times 3-3\frac{1}{2} \mu$ , borne 4 to a basidium on very slender sterigmata of the usual *Corticium* kind; the basidia are simple, cylindric or clavate,  $9-10 \times 4-4\frac{1}{2} \mu$ ; the hyphae are sometimes nodose-septate, and some are incrustated in the region of the substratum. Karsten's publication of *Corticium roseolum* antedates that by Masee and renders unnecessary *Corticium subroseum* Sacc. & Syd. in Sacc. Syll. Fung. 14: 223. 1899.

<sup>1</sup> K. Akad. Wiss. Wien, Sitzungsber. 115: 1557. 1906.

## Specimens examined:

- Sweden: Stockholm, *L. Romell*, 125, 141, 142, 143, 149, 150, 184.  
 Austria-Hungary: Sonntagberg, *Strasser*, comm. by Bresadola under the name *T. incarnata*.  
 France: Aveyron, *A. Galzin*, comm. by H. Bourdot, 15423; Allier, *H. Bourdot*, 1798, determined by Quelet, and 3765 under the name *T. incarnata*.  
 New Hampshire: Chocorua, *W. G. Farlow*.  
 Vermont: Little Notch, Bristol, *E. A. Burt*; Middlebury, *E. A. Burt*; Chapman's Mill, Middlebury, *E. A. Burt*.  
 Massachusetts: Magnolia, *W. G. Farlow* (in Farlow Herb.); Sharon, *A. P. D. Piguet*, comm. by *W. G. Farlow*, N (in Mo. Bot. Gard. Herb., 55002); Sherborn, *H. P. Morse*, comm. by *W. G. Farlow*; Waltham, *W. G. Farlow* (in Farlow Herb.).  
 New York: East Galway, *E. A. Burt*.  
 Washington: Bingen, *W. N. Saksdorf*, 906.

3. *T. fusco-violacea* Bresadola, *Fungi Tridentini* 2: 98. pl. 210. f. 1. 1900; *Sacc. Syll. Fung.* 16: 203. 1902; Bourdot & Galzin, *Soc. Myc. Fr. Bul.* 25: 31. 1909; Juel, *Arkiv för Bot.* 14<sup>1</sup>: 8. 1915.

Illustrations: Bresadola, *Fungi Tridentini* 2: pl. 210. f. 1.

Type: authentic specimen in Burt Herb.

Fructification effused, thin, ecru-drab, fading to pale smoke-gray and pale olive-gray in the herbarium; in structure 40–60  $\mu$  thick, composed of hyaline, interwoven hyphae 4–5  $\mu$  in diameter; sterigmata 12–15  $\times$  4½–6  $\mu$ ; spores hyaline under the microscope, even, 10–15  $\times$  3–5  $\mu$ .

Fructifications 3–5 cm. in diameter.

On bark of *Abies* and sometimes of frondose species. New Hampshire to Pennsylvania. August to December. Rare.

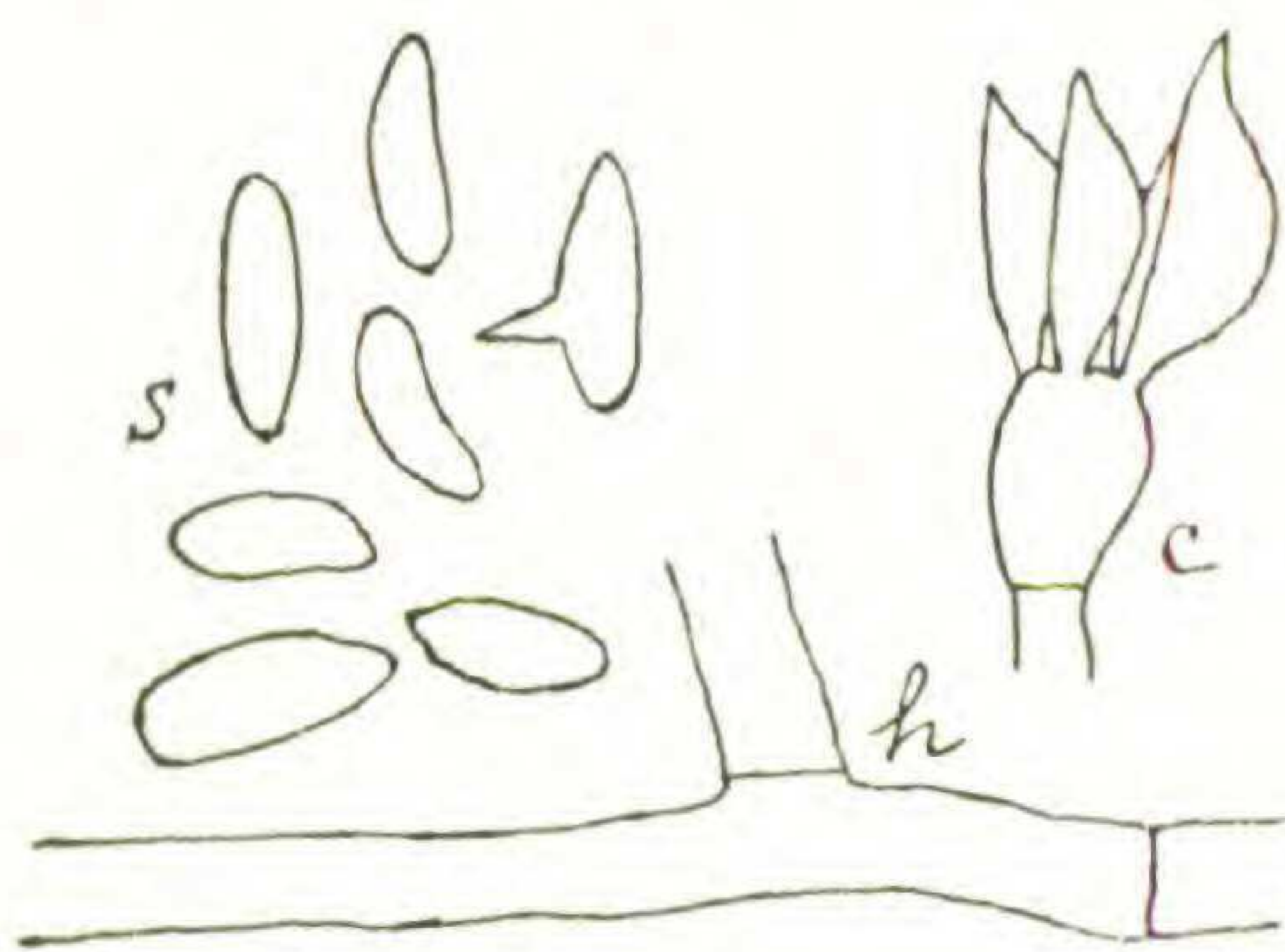


Fig. 3. *T. fusco-violacea*. Basidium, *c*, with fully developed sterigmata; spores, *s*; hypha, *h*.  $\times$  870. From authentic specimen from Bresadola. One spore shows a curious projection.

*T. fusco-violacea* is distinguished from the other species hitherto found in North America by having slender and elongated, rather than subglobose, spores. Bresadola described the color of the fructification as fusco-violaceous when in vegetative condition, drying lilacinus; I have seen dried specimens only, and that from Bresadola is now pale smoke-gray.

Specimens examined:

Sweden: Femsjö, *L. Romell*, 418.

Tyrol: Cavallente, *G. Bresadola*.

New Hampshire: Crawford Notch, *L. O. Overholts*, 4883 (in Mo. Bot. Gard. Herb., 56076).

Pennsylvania: Trexlertown, *W. Herbst*, 53.

#### VELUTICEPS

*Veluticeps* Cooke emend. Patouillard, Soc. Myc. Fr. Bul. 10: 78. pl. 3. f. 1. 1894; Cooke, *Grevillea* 8: 148. 1880 (in part).—*Veluticeps* as a section of *Hymenochaete* Masee, Linn. Soc. Bot. Jour. 27: 116. 1890; not of Sacc. Syll. Fung. 6: 600. 1888.

Hymenium velvety with fascicles of colored, flexuous hyphae.

The type species is *Veluticeps Berkeleyi* Cooke, which was published originally as *Hymenochaete veluticeps* Berk. & Curtis.

The fructifications are pileate in the species best known; either dimidiate in our single Cuban species or sessile and attached by the vertex in the species occurring on the opposite side of the world in New South Wales. In both species the fascicles of colored hyphae are 800  $\mu$  or more long, about 40–60  $\mu$  in diameter, and traverse the whole or a large part of the fructification perpendicular to the surface of the hymenium, beyond which they protrude up to 40–100  $\mu$ . The colored hyphae composing the fascicles are about 4½  $\mu$  in diameter, cylindrical, sometimes granule-incrusted—especially in the deeper portions of the fructification—and are closely crowded together, perhaps 20 or more to a fascicle; they have the character of the colored cystidia, which are scattered between the basidia in the hymenium of *Stereum abietinum*, *S. glaucescens*, and *S. abnormis*, rather than of the conical, pointed setae characteristic of species of *Hymenochaete*. The genera *Mycobonia* and *Epithele* are closely related to *Veluticeps* by fascicles of hyphae protruding

from the hymenium, but have the fascicles composed of hyaline hyphae.

**Veluticeps Berkeleyi** Cooke, *Grevillea* 8: 149. 1880; Patouillard, *Myc. Soc. Fr. Bul.* 10: 77. *pl. 3. f. 1.* 1894.

*Hymenochaete veluticeps* Berk. & Curtis, *Linn. Soc. Bot. Jour.* 10: 333. 1868; Sacc. *Syll. Fung.* 6: 600. 1888; Masee, *Linn. Soc. Bot. Jour.* 27: 116. 1890.

Illustrations: *Myc. Soc. Fr. Bul.* 10: *pl. 3. f. 1.*

Type: in Kew Herb. and in Curtis Herb.

Fructification dimidiate, coriaceous, hard and brittle, on the upper side brown, sulcate-zonate, velutinous, becoming glabrous; hymenium pallid cinnamon, plane, thickly studded with pro-

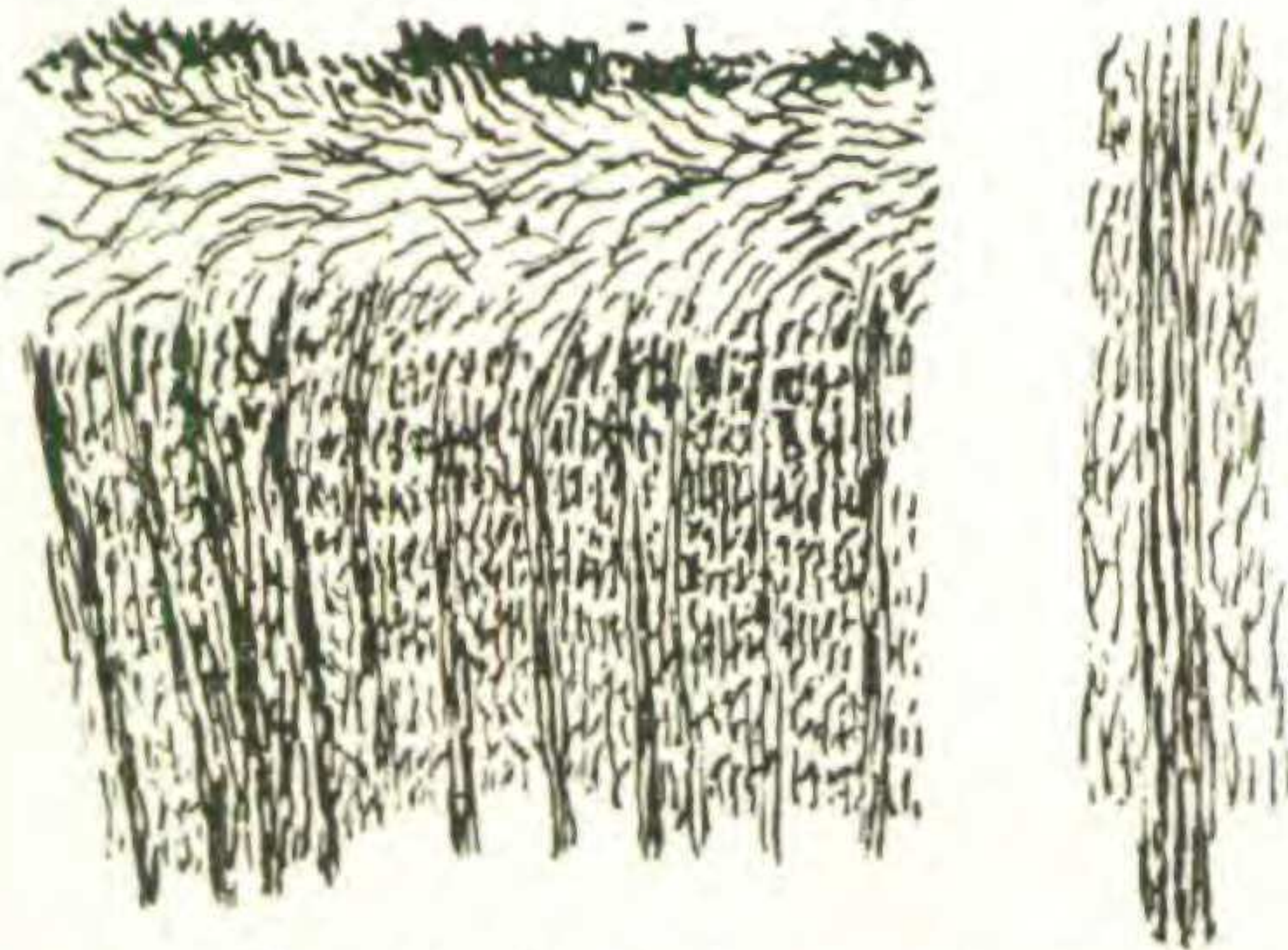


Fig. 4. *V. Berkeleyi*. Section of fructification at left, showing hyphal fascicles,  $\times 19$ ; at right, a single fascicle,  $\times 90$ .

truding fascicles of very dark hyphae; in structure 1–2 mm. thick, composed throughout of colored hyphae arranged in three layers, a broad intermediate layer of longitudinally arranged hyphae which turn upward on the upper side to form the velutinous surface layer and turn downward on the opposite side and terminate in the hymenium; bister-colored hyphal fascicles 40–60  $\mu$  in diameter, 300  $\mu$  or more long, extend

through the under layer of tawny olive subhymenial hyphae and protrude up to 40–60  $\mu$  beyond the basidia; spores not found.

On logs in woods, often on the under side. May, July. Cuba.

*V. Berkeleyi* may be recognized by its aspect of a *Hydnum* which upon close examination shows its teeth-like projections on the hymenial side to be really hyphal fascicles not covered by the hymenium. The spores were found to be ovoid and hyaline by Patouillard. Six collections of this species by C. Wright are reported by Berkeley & Curtis in *Fungi Cubenses*, from which it would seem that the species is common, but I have been able to see no more recent collections from any source. It is possible



that my correspondents have roughly classified their collections of this species as a *Hydnum* and withheld specimens of it.

Specimens examined:

Cuba: *C. Wright*, 264 (in Curtis Herb.).

In working over the species of *Aleurodiscus* which have been described, I found that the *Aleurodiscus tabacinus* Cooke should be transferred to *Veluticeps*. Although the species is extra limital and not likely to be found in North America, I now make this transfer and add the following notes on structure:

***Veluticeps tabacina*** (Cooke) Burt, n. comb.

*Aleurodiscus tabacinus* Cooke, *Grevillea* 14: 11. 1885; *Handb. Australian Fungi*, 193. 1892.—*Corticium tabacinum* (Cooke) Sacc. *Syll. Fung.* 6: 607. 1888.

Fructifications pileate, hemispherical or cup-shaped, sessile, apparently attached by the vertex, drying nearly black; in structure 800  $\mu$  thick, with a nearly black, crust-like zone on the upper side, from which a broad layer of hyaline hyphae extends to the hymenium and is traversed by brown hyphal fascicles; hymenium drying Verona brown, not covering the protruding fascicles; fascicles about 6 to a mm., 50–60  $\mu$  in diameter, up to 900  $\mu$  long, protruding up to 100  $\mu$  beyond the hymenium, composed of flexuous, colored hyphae 3  $\mu$  in diameter; basidia simple, 100  $\times$  9–10  $\mu$ , bearing the spores on 4 slender sterigmata; spores hyaline, even, flattened on one side, 16  $\times$  6  $\mu$ .

Fructifications 2–3 mm. in diameter, 1–1½ mm. thick.

On wood. New South Wales.

*V. tabacina* is distinct from *V. Berkeleyi* by attachment of its pileus by the center, and by its hyaline substance and subhymenial tissue; when a fertile specimen of *V. Berkeleyi* is available, a difference in spores may perhaps be found.

Specimens examined:

Australia: New South Wales, comm. by G. Masee (in N. Y. Bot. Gard. Herb.).

#### MYCOBONIA

*Mycobonia* Patouillard, *Myc. Soc. Fr. Bul.* 10: 76. 1894 (with diagnosis under *Bonia* Patouillard, *Myc. Soc. Fr. Bul.* 8:

48. 1892, but not *Bonia* Balansa).—*Grandinioides* Banker, Torr. Bot. Club Mem. **12**: 179. 1906.

Thelephoraceous fungi having the hymenium bristling with short cylindric fascicles of hyaline hyphae which arise from the subhymenial tissue.

The type species is *Mycobonia flava*.

Patouillard intended at first that this genus should include both resupinate and pileate species, but he soon transferred the known resupinate species to *Heterochaete* on account of the longitudinally septate basidia. A few years later he introduced *Epithele* in connection with resupinate species, having hyphal fascicles like those of *Mycobonia flava*.

#### KEY TO THE SPECIES

- Fructification sessile . . . . . 1. *M. flava*  
Fructification stipitate . . . . . 2. *M. brunneoleuca*

**1. *Mycobonia flava*** (Swartz) Patouillard, Myc. Soc. Fr. Bul. **10**: 76. pl. 3. f. 2. 1894; *Ibid.* **16**: 180. 1900.

*Hydnum flavum* Swartz ex Berkeley, Ann. & Mag. Nat. Hist. **1. 10**: 380. pl. 10. f. 8. 1842; Linn. Soc. Bot. Jour. **10**: 324. 1868; Sacc. Syll. Fung. **6**: 456. 1888.—*Peziza flava* Swartz, Prodr. 150. 1788; Fl. Ind. Oc. **3**: 1939. 1806.—*Bonia flava* (Berk.) Patouillard in Engl. & Prantl, Nat. Pflanzenfam. (**1. 1\*\***): 123. text f. 68G–H. 1898.—*Grandinioides flavum* (Swartz) Banker, Torr. Bot. Club Mem. **12**: 179. 1906.

Illustrations: Ann. & Mag. Nat. Hist. **1. 10**: pl. 10. f. 8; Myc. Soc. Fr. Bul. **10**: pl. 3. f. 2; Engl. & Prantl, Nat. Pflanzenfam. (**1. 1\*\***): text f. 68 G–H.

Type: in British Mus. Herb. according to Berkeley, *loc. cit.*

Fructification coriaceous, convex, somewhat orbicular to reniform, sessile, attached by a point on one side, even, glabrous, drying ochraceous buff to cinnamon; hymenium ochraceous buff, with numerous short hyphal fascicles suggesting the teeth of a *Hydnum*; fascicles cylindric, 5–6 to a mm., 60–120 × 40–60 μ, composed of hyaline or subhyaline hyphae; basidia simple, clavate, 30 × 6–7½ μ; spores hyaline, even, 10–16 × 6 μ, not seen attached to the basidia.

Fructifications 1–3 cm. long, 1½–3 cm. broad.

On fallen branches and old logs. Florida, Louisiana, Jamaica, West Indies, and Venezuela. August to November.

When examined by the naked eye or with a magnifying glass, *M. flava* is not distinguishable from a *Hydnum*, but when sections are examined with the compound microscope, the hymenium is found to be a plane surface pierced here and there by the protruding fascicles of hyphae. The spore dimensions are those of spores which were on the surface of the hymenium. A specimen in the collection from Florida has a stem 1 mm. long, but the spores are  $13 \times 6\frac{1}{2} \mu$  and other characters such that I refer the collection to *M. flava*.

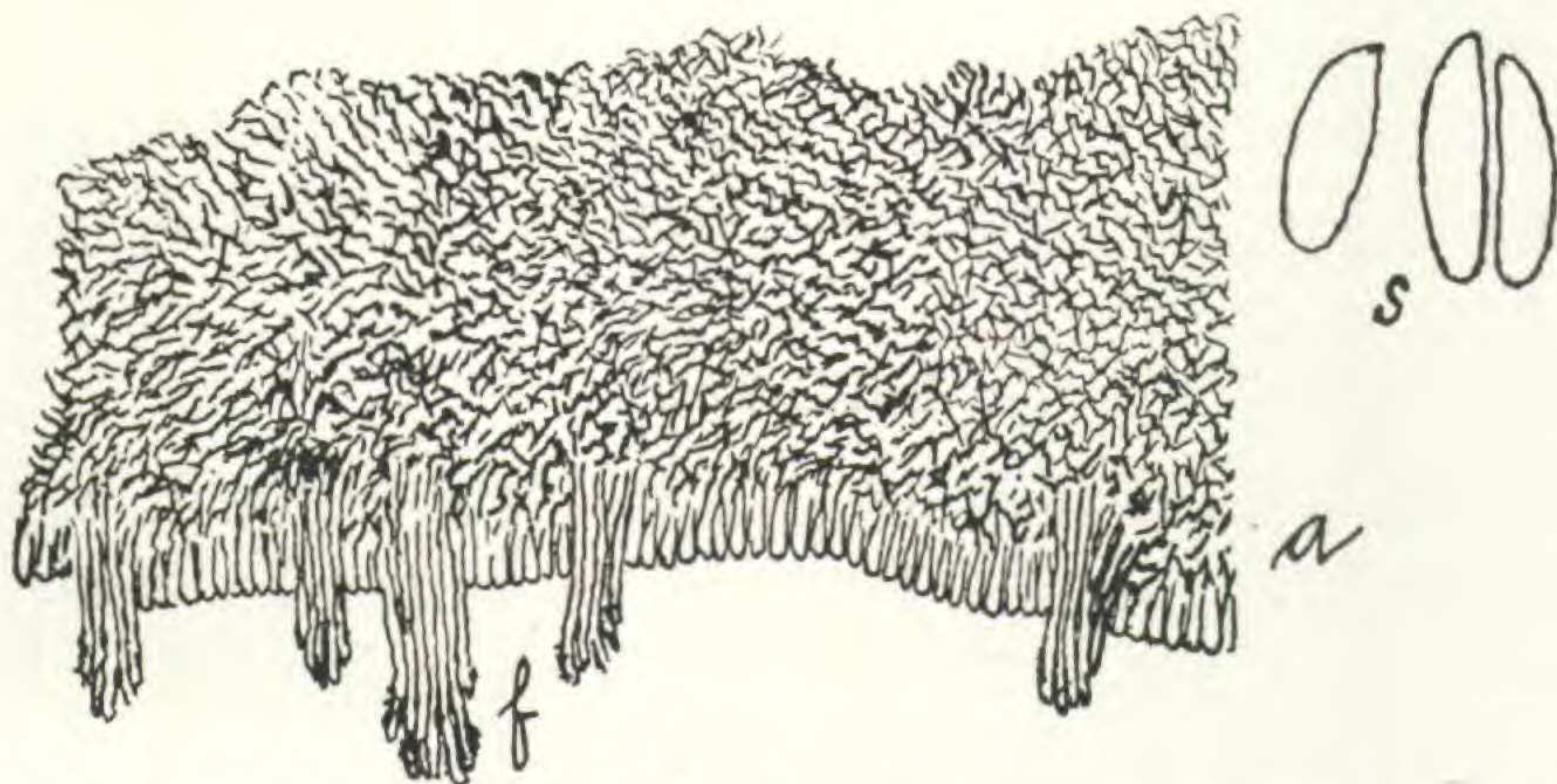


Fig. 5. *M. flava*. Section of fructification, *a*, showing hyphal fascicles, *f*,  $\times 90$ ; spores, *s*,  $\times 870$ .

Specimens examined:

Florida: Cocoanut Grove, *R. Thaxter* (in Mo. Bot. Gard. Herb., 43985).

Louisiana: St. Martinville, *A. B. Langlois*.

Cuba: *C. Wright* (in Curtis Herb.); Guantonamo (in Weir Herb., 10849); Pinar del Rio San Diego de los Baños, *N. L. Britton*, *F. S. Earle* & *C. S. Gager*, 6823 (in N. Y. Bot. Gard. Herb., Burt Herb., and Mo. Bot. Gard. Herb., 56075); Puerto Principe, *F. S. Earle*, 312.

2. *M. brunneoleuca* (Berk. & Curtis) Patouillard, Myc. Soc. Fr. Bul. 16: 181. 1900; Duss, Fl. Crypt. Antilles Fr. 233. 1903.

*Hydnum brunneoleucum* Berk. & Curtis, Linn. Soc. Trans. 22: 129. 1857; Linn. Soc. Bot. Jour. 10: 325. 1868; Sacc. Syll.

Fung. 6: 457. 1888.—*Grandinioides flavum* (Swartz) Banker, Torr. Bot. Club Mem. 12: 179. 1906 (in part).

Type: in Kew Herb. and Curtis Herb.

Pileus helmet-shaped to flabelliform, vaulted, thin, yellowish brown, slightly streaked behind, glabrous; stem very short, brownish; hymenium whitish, sprinkled with many scattered strong bristles.

Pileus  $3\frac{1}{2}$ –4 cm. long, nearly as broad.

On dead wood. Martinique and Venezuela.

Patouillard has noted in the place cited that the pileus may attain a diameter of 15 cm., and that the stem is short, thick, and black at the base. Banker includes *M. brunneoleuca* in *M. flava* as a poorly developed form.

I have examined no specimens of *M. brunneoleuca*. The description of the species is that given by Berkeley & Curtis.

#### EPITHELE

*Epithele* (as a section of *Hypochnus*) Patouillard, Myc. Soc. Fr. Bul. 15: 202. 1899.—*Epithele* Patouillard, Essai Taxon. Hym. 59. 1900; Duss, Fl. Crypt. Antilles Fr. 226. 1903; v. Höhn. & Litsch. K. Akad. Wiss. Wien Sitzungsber. 115: 1595. 1906; Bourdot & Galzin, Soc. Myc. Fr. Bul. 27: 264. 1911.

Resupinate thelephoraceous fungi lacking an intermediate layer and having the hymenium bristling with short cylindric fascicles of hyaline hyphae which arise from the subhymenial tissue.

The type species is *Epithele Dussii*.

The four species of *Epithele*, known at present, are very thin and delicate in structure and constitute a natural group which is not connected with *Mycobonia* by thick resupinate species with either an intermediate layer or with a doubtful intermediate layer—doubtful merely because the hyphae are interwoven rather than arranged longitudinally in the region of the intermediate layer. *Epithele Typhae* (Pers.) Pat. is a frequent species in Europe on dead leaf bases of *Typha*; if present in the United States, it may have been regarded as one of the *Hydnaceae* on account of the hyphal fascicles in the hymenium.

## KEY TO THE SPECIES

- Fructification elliptical, white; spores  $6-7 \times 2\frac{1}{2}-3 \mu$ ; on tree fern . . . . . 1. *E. Dussii*  
 Fructification interruptedly effused, sulphur-yellow; spores  $9-12 \times 7-9 \mu$ ; on  
 palmetto . . . . . 2. *E. sulphurea*

1. ***Epithele Dussii*** Patouillard, Essai Taxon. Hym. 59. 1900;  
 Duss, Fl. Crypt. Antilles Fr. 226. 1903.

*Hypochnus Dussii* Patouillard, Myc. Soc. Fr. Bul. 15: 202.  
 1899; Sacc. Syll. Fung. 16: 197. 1902.—*Peniophora Dussii*  
 (Patouillard) v. Höhn. & Litsch. K. Akad. Wiss. Wien Sitzungs-  
 ber. 116: 749. text f. 2. 1907.

Fructification resupinate, very thin, strongly adhering, forming a coating well defined, white or whitish,  $3-15 \times 3-4$  mm.; fascicles very numerous, erect, white,  $20-25 \mu$  in diameter, protruding up to  $100 \mu$ , composed of hyphae; basidia 2- or 4-spored,  $13 \times 6 \mu$ ; spores hyaline, even, attenuated towards the apex,  $6-7 \times 2\frac{1}{2}-3 \mu$ ; layer between hymenium and substratum about  $20 \mu$  thick.

On dead trunks of tree ferns. Guadeloupe and Venezuela.

The type, which I have not seen, was collected on the dead trunk of *Alsophila aspera*. The collection from Venezuela, cited below, although lacking spores, has the characteristic hyphal fascicles of *Epithele Dussii* and agrees well with Patouillard's description except in being broadly effused. This specimen is 10 cm. long,  $1\frac{1}{2}$  cm. wide, and broken off with the substratum along one side and at both ends; hence the fructifications probably become long and widely effused.

Specimens examined:

Venezuela: Mt. El Val, *A. F. Blakeslee*, J2, comm. by W. G. Farlow (in Mo. Bot. Gard. Herb., 13614).

2. ***E. sulphurea*** Burt, n. sp.

Type: in Farlow Herb. and Mo. Bot. Gard. Herb.

Fructifications resupinate, interruptedly effused, drying pale sulphur-yellow to marguerite-yellow; in structure  $300 \mu$  thick, composed of loosely interwoven, thick-walled, hyaline hyphae  $2-3 \mu$  in diameter; fascicles about 9 to a mm.,  $15-30 \mu$  in diameter, protruding up to  $100 \mu$ , composed of hyaline hyphae; basidia

simple, 8–10  $\mu$  in diameter, 4-spored; spores hyaline, even, 9–12  $\times$  7–9  $\mu$ .

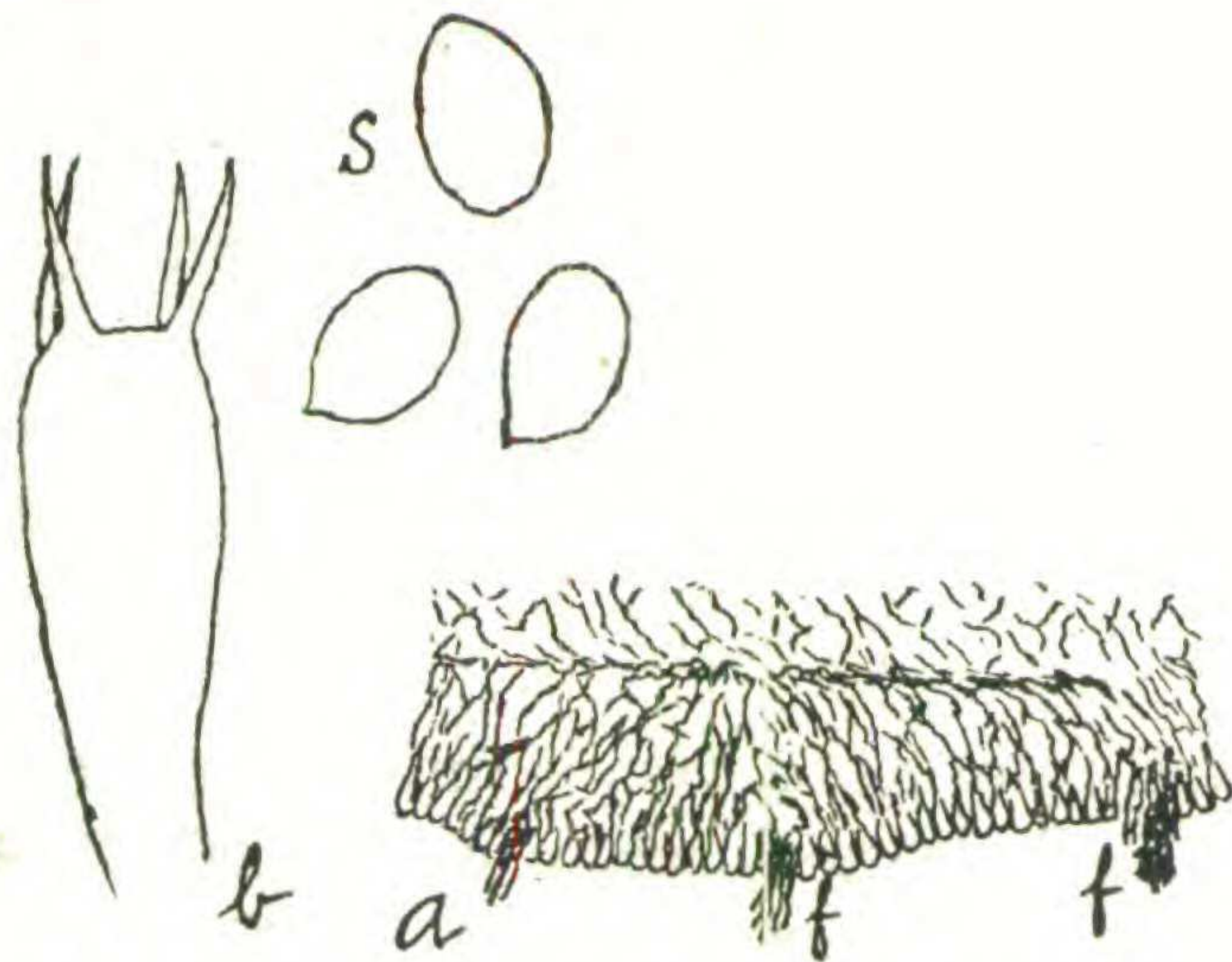


Fig. 6. *E. sulphurea*. Section of fructification, *a*, showing hyphal fascicles, *f*,  $\times$  19; basidium, *b*, and spores, *s*,  $\times$  650.

On palmetto. Florida. Autumn.

*E. sulphurea* is noteworthy by its greenish yellow color and spores much larger than those of other species of this genus. Collections of this species are likely to be included in *Hydnum* or *Odontia*, unless examination of sectional preparations is made with the microscope to show that teeth covered by the hymenium are not present.

Specimens examined:

Florida: Palm Beach, *R. Thaxter*, 52, type (in Farlow Herb. and in Mo. Bot. Gard. Herb., 43940).

#### LACHNOCLADIUM

*Lachnocladium* L veill  in d'Orbigny, Dict. Hist. Nat. 8: 487. 1846; Morgan, Cincinnati Soc. Nat. Hist. Jour. 10: 192. 1888; Sacc. Syll. Fung. 6: 738. 1888; Patouillard, Jour. de Bot. 3: 23. pl. 1. 1889; Engl. & Prantl, Nat. Pflanzenfam. (1: 1\*\*): 137. 1898.—*Eriocladus* L veill , Ann. Sci. Nat. Bot. III. 5: 158. 1846, but not of Lindley.

Fructifications coriaceous or somewhat coriaceous, branched, tomentose; branches compressed or terete; coralloid fungi growing on wood or on the ground.

This genus was founded upon a group of seven species, of which none was designated as the type species.

The distinctive characters of *Lachnocladium* are coriaceous consistency and more or less hairy covering of fructifications; by these characters the genus is distinguished from *Clavaria*. At the time of publication of *Lachnocladium* under the name *Eriocladus*, as first proposed, Léveillé restricted the Persoonian genus *Merisma* to glabrous, coriaceous, branched species of the *Clavariaceae*. He had *Clavaria* include fleshy species only, *Merisma*, the glabrous coriaceous species, and *Lachnocladium*, tomentose species so tomentose that the branches were tomentose. Mycologists have not accepted *Merisma* as understood by Léveillé; they have transferred to *Pterula* most of the species which Léveillé had in *Merisma*, and have by their usage modified the idea of *Lachnocladium* by publishing as members of this genus many species which do not have their branches tomentose but differ from branched species of *Clavaria* by being coriaceous.

*Lachnocladium* comprises a series of species parallel with *Clavaria*; some of the species have hyaline spores, others have more or less ochraceous spores, some, even spores, and some, rough-walled to aculeate spores. Species with dark-colored, more or less rough-walled to muricate spores are better referable to *Thelephora*.

Léveillé regarded *Lachnocladium* as one of the *Clavariaceae* and the genus is located there in Saccardo's 'Sylloge Fungorum' and by Hennings in Engler & Prantl's 'Nat. Pflanzenfam.' Berkeley & Curtis arranged the species of *Lachnocladium* between those of *Thelephora* and *Stereum* in their 'Notices of North American Fungi'<sup>1</sup> and 'Fungi Cubenses.'<sup>2</sup> Patouillard includes *Lachnocladium* in his series of *Thelephores*. In North America there are no species connecting, or intermediate between, *Lachnocladium* and *Thelephora*. While I have had no opportunity to study the various exotic species with dark-colored, echinulate spores which have been published as *Lachnocladium*, it seems very probable that the transfer of such species to *Thelephora* near *Thelephora anthocephala* would

<sup>1</sup> Grevillea 1: 161. 1873.

<sup>2</sup> Linn. Soc. Bot. Jour. 10: 330. 1868.

leave the remaining species of *Lachnocladium* clearly in the *Clavariaceae*.

I include *Lachnocladium* for reference by students of the *Thelephoraceae* because some authors have regarded it as a member of the latter family.

Collectors' field notes on whether the species are coriaceous or fleshy at the time of collecting are necessary for sharply separating *Lachnocladium* and *Clavaria*, for it is evident that these characters may not be well shown in the case of dried specimens of some species.

#### KEY TO THE SPECIES

- |  |                            |
|--|----------------------------|
| Spores hyaline . . . . .   | 1                          |
| Spores more or less ochraceous . . . . .   | 4                          |
| Spores dark-colored; in Guadeloupe . . . . .   | 11. <i>L. guadelupense</i> |
| 1. Spores ovoid or cylindric . . . . .   | 2                          |
| 1. Spores subglobose . . . . .   | 3                          |
| 2. Spores even, $3-4\frac{1}{2} \times 2-2\frac{1}{2} \mu$ ; radiately branched organs like those of <i>Asterostroma</i> present; Cuba to Brazil . . . . . | 1. <i>L. brasiliense</i>   |
| 2. Spores even, $9 \times 6 \mu$ ; fructification somewhat cartilaginous; in Cuba . . . . .  | 2. <i>L. cartilagineum</i> |
| 2. Spores even, $6-12 \times 3-3\frac{1}{2} \mu$ ; fructification dry, $2\frac{1}{2}-4$ cm. high; on rotting leaves, Vermont to Ohio . . . . .             | 3. <i>L. Micheneri</i>     |
| 2. Spores even, $12-15 \times 5-6 \mu$ ; fructification 3-4 cm. high, everywhere clothed with whitish down; in Pennsylvania . . . . .                      | 4. <i>L. semivestitum</i>  |
| 2. Spores $7-10 \times 2\frac{1}{2}-4\frac{1}{2} \mu$ ; fructifications 8 cm. high; on wood; Connecticut . . . . .   | 12. <i>L. odoratum</i>     |
| 3. Spores even, $3-3\frac{1}{2} \times 2\frac{1}{2}-3 \mu$ ; fructification $2\frac{1}{2}$ cm. high; on the ground, New Jersey and Pennsylvania . . . . .  | 5. <i>L. subsimile</i>     |
| 3. Spores even, $3\frac{3}{4}-4\frac{1}{2} \mu$ in diameter; fructification 4 cm. high; on wood, Cuba . . . . .  | 6. <i>L. cervinum</i>      |
| 3. Spores even, $9\frac{1}{2} \times 8-9 \mu$ ; on the ground, New Hampshire, Massachusetts, and New York . . . . .  | 7. <i>L. bicolor</i>       |
| 4. Spores even, $7-12 \times 4\frac{1}{2}-6 \mu$ ; fructification velvety, ochraceous-ferruginous, 7-12 cm. high; on rotten wood, South America . . . . .  | 8. <i>L. furcellatum</i>   |
| 4. Spores even, $6-7 \times 3-3\frac{1}{2} \mu$ ; fructification drying drab, clothed with a gray down, 8 cm. high; on wood, West Virginia . . . . .       | 9. <i>L. erectum</i>       |
| 4. Spores even, $9-10 \times 4\frac{1}{2}-5\frac{1}{2} \mu$ ; stem 1 cm. in diameter; branch portion 6-7 cm. high, 5-6 cm. broad; North Carolina . . . . . | 10. <i>L. Atkinsonii</i>   |

1. ***Lachnocladium brasiliense*** Léveillé, Ann. Sci. Nat. Bot. III. 5: 159. 1846 (*Eriocladus*); Berk. & Curtis, Linn. Soc. Bot. Jour. 10: 330. 1868; Sacc. Syll. Fung. 6: 738. 1888; Patouillard, Jour. de Bot. 3: 26. pl. 1. j. 5. 1889. Plate 5, fig. 1. Illustrations: Patouillard, *loc. cit.*



Type: stated by L veill  to be in De Candolle Herb.; Patouillard notes a specimen of original locality and collector—Bahia, *Blanchet*—in Museum of Paris Herb.

Fructification very short-stipitate, most highly branched, coriaceous, drying to tawny olive; branches solid, terete, dichotomous, with slender acute tips; spores hyaline, even,  $3-4\frac{1}{2} \times 2-2\frac{1}{2} \mu$ , borne on simple basidia; underneath the hymenium radiately branched organs like those of *Asterostroma*, pale-colored, with slender, flexuous rays up to  $30 \times 3 \mu$ , are abundant

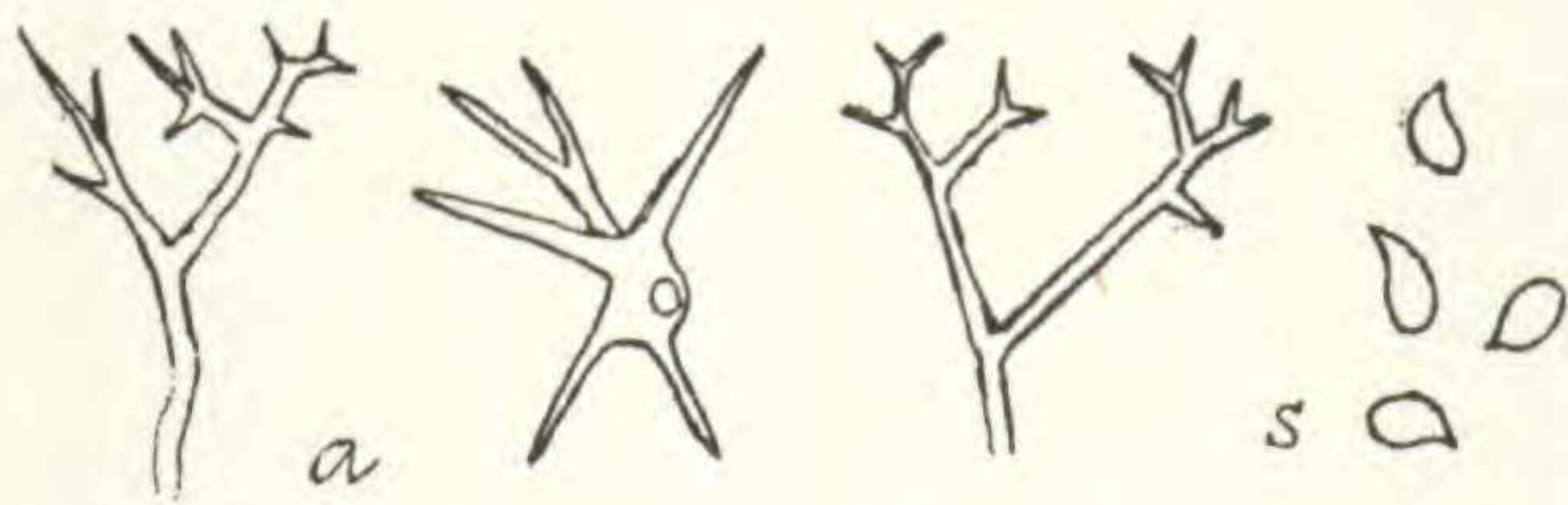


Fig. 7. *L. brasiliense*. Antler-shaped and star-shaped organs, *a*; spores, *s*.  $\times 870$ .

and form the outer part of the medullary part of the branches and the somewhat spongy outer surface of the fructification where the hymenium is absent.

Fructifications 3–5 cm. high, about 3 cm. in diameter.

On rotting wood. Cuba to Brazil.

*L. brasiliense* is distinguished by its small, hyaline spores and by the brownish, antler-shaped and star-shaped organs, the latter suggestive of those of *Asterostroma*, which are abundant underneath the hymenium and form the sterile surface elsewhere.

Specimens examined:

Cuba: *C. Wright* (in Curtis Herb., under the name *Thelephora brasiliensis* L v.); *C. Wright*, 831, under the name *Lachnocladium furcellatum* (in Curtis Herb. and in Mo. Bot. Gard. Herb., 43838).

2. *L. cartilagineum* Berk. & Curtis, Linn. Soc. Bot. Jour. 10: 330. 1868; Sacc. Syll. Fung. 6: 739. 1888; Patouillard, Jour. de Bot. 3: 26. *pl. 1. f. 4.* 1889. Plate 5, fig. 2.

Illustrations: Patouillard, *loc. cit.*

Type: in Kew Herb. and Curtis Herb.

Fructifications somewhat cartilaginous, erect, drying honey-yellow to olive-brown, densely and repeatedly branched above; branches cylindric, very sharp-pointed; stem slender, cylindric, strigose-hairy at the base; spores hyaline, even,  $9 \times 6 \mu$ , slightly flattened on one side, apiculate.



Fig. 8.

*L. cartilagineum*.  
Spores,  $\times 870$ .

Fructifications 4 cm. high,  $1-2\frac{1}{2}$  cm. in diameter; stem  $1\frac{1}{2}-2$  cm. long,  $1\frac{1}{2}-2$  mm. in diameter.

On the ground. October. Cuba.

Patouillard has noted the spores of this species as ochraceous and a little smaller than I find them. The spores are very abundant in preparations from the type specimen, but the basidia are not well enough preserved to demonstrate whether simple or longitudinally cruciately septate.

Specimens examined:

Cuba: *C. Wright*, 204, type (in Curtis Herb.).

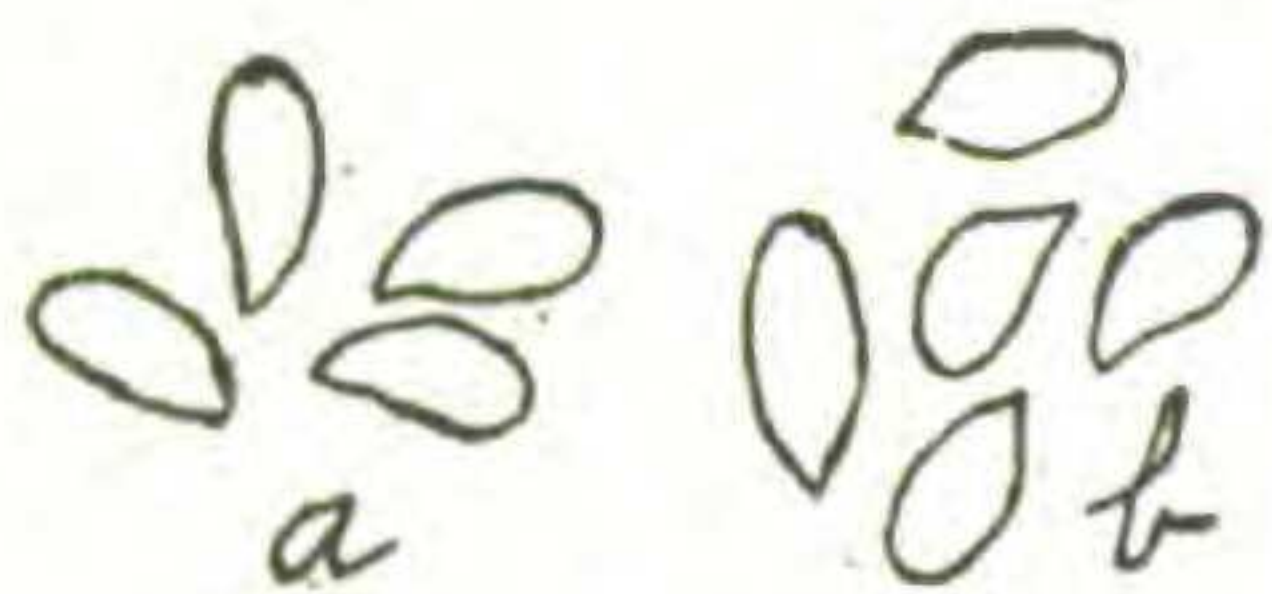
3. **L. Micheneri** Berk. & Curtis, *Grevillea* 1: 161. 1873; Morgan, *Cincinnati Soc. Nat. Hist. Jour.* 10: 192. 1888; Sacc. *Syll. Fung.* 6: 739. 1888; Hard, *Mushrooms*, 476. *text f.* 401. 1908. Plate 5, fig. 3.

*Clavaria fragrans* Ell. & Ev. *N. Am. Fungi*, 2023. 1888. See Cooke, *Grevillea* 17: 59. 1889.—An *Lachnocladium odoratum* Atkinson, *Ann. Myc.* 6: 58; 1908?

Illustrations: Hard, *Mushrooms*, *text f.* 401.

Type: in Kew Herb. and Curtis Herb.

Fructifications gregarious, coriaceous, dry, repeatedly forked and branched and drying drab-gray above; stem cylindric, light buff, tomentose below, arising singly or in a few individuals from more or less effused, mycelial patches on decaying leaves; smaller branches filiform, flexuous, with paler tips; irregular, tomentose patches at various places on main trunk, branches, or axils of branches where hymenium has failed to develop; hymenium glabrous, no cystidia nor hairs present; spores hyaline, even,  $6-12 \times 3-3\frac{1}{2} \mu$ .

Fig. 9. *L. Micheneri*.

Spores,  $\times 87$ ; *a*, from type; *b*, from Burt coll.

Fructifications  $2\frac{1}{2}$ –4 cm. high,  $1-1\frac{1}{2}$  cm. broad; main stem 2–3 mm. in diameter.

On rotting leaves in groves. Canada to New Jersey and westward to Missouri.

This species forms an orbicular, villose or mycelial patch on the surface of leaves—very often beech leaves—and from these patches arise one or two stems, which are tomentose below. In the field notes of this species I have the record, “bitter to taste,” but the dried specimens are not bitter now.

Specimens examined:

Exsiccati: Ell. & Ev., N. Am. Fungi, 2023, type distribution of *Clavaria fragrans*; Ell. & Ev., Fungi Col., 1022.

Canada: Ontario, London, *J. Dearness*, in Ell. & Ev., Fungi Col., 1022.

Vermont: Newfane, *C. D. Howe*; Sudbury, *E. A. Burt*.

New York: Snyders, *C. H. Peck* (in N. Y. State Mus. Herb. and in Mo. Bot. Gard. Herb., 56113).

New Jersey: Newfield, *J. B. Ellis*, in Ell. & Ev., N. Am. Fungi, 2023.

Pennsylvania: *E. Michener*, 479, type (in Curtis Herb., 3534); Bethlehem, *Schweinitz*, the *Clavaria crispula* and *C. byssiseda* of Schweinitz, Syn. N. Am. Fungi, 1024 and 1034 respectively (in Herb. Schweinitz).

Ohio: *C. G. Lloyd*, 3817 (in Lloyd Herb., Burt Herb., Farlow Herb., and Mo. Bot. Gard. Herb., 44653); Oxford, *L. O. Overholts*, 1487 (in Overholts Herb.).

Missouri: Wickes, *E. A. Burt* (in Mo. Bot. Gard. Herb., 43813.)

**4. *L. semivestitum*** Berk. & Curtis, Grevillea 1: 161. 1873; Morgan, Cincinnati Soc. Nat. Hist. Jour. 10: 192. 1888; Sacc. Syll. Fung. 6: 739. 1888. Plate 5, fig. 4.

Type: in Kew Herb. and Curtis Herb.

Fructifications coriaceous, erect, repeatedly furcate-branched, the branches terete, rather straight, rising rather close together, everywhere clothed with whitish down except on the final branchlets, drying between light brownish olive and buffy brown; spores of the type hyaline, even,  $12-15 \times 5-6 \mu$ .

Fructifications 3–4 cm. high, about 1 cm. in diameter across branches.

On the ground. Pennsylvania.

The fructifications of *L. semivestitum* probably occur solitary or gregarious on the ground. Distinguishing characters are slender, erect habit of growth, appressed branches, and large, hyaline, even spores. In the dried specimen the branches are pruinose rather than hairy. Cooke referred to *L. semivestitum* the specimens distributed by Ell. & Ev., N. Am. Fungi, 2024, under the name *Clavaria velutina* Ell. & Ev. without description, and Ellis & Everhart distributed in Fungi Col., 808, under the name *L. semivestitum* specimens growing on rotten wood in West Virginia, but neither of these distributions can be *L. semivestitum*, for their spores are much too small.

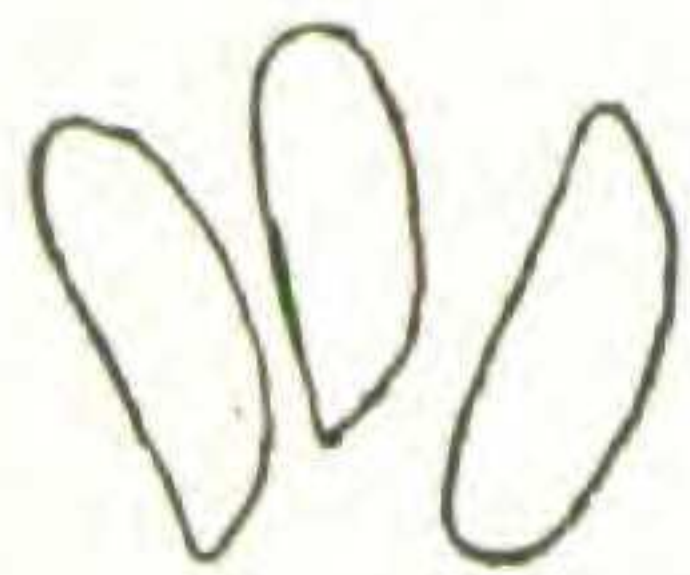


Fig. 10.  
*L. semivestitum*.  
Spores,  $\times 870$ ;  
from type.

Specimens examined:

Pennsylvania: *E. Michener*, 1184, type (in Curtis Herb., 4260).

5. *L. subsimile* Berk. Grevillea 1: 161. 1873; Sacc. Syll. Fung. 6: 739. 1888. Plate 5, fig. 5.

Type: in Kew Herb. and Curtis Herb.

Fructifications coriaceous, slender, delicately and repeatedly dichotomously branched, minutely tomentose except on the branchlets, drying between light brownish olive and buffy brown; spores hyaline, even,  $3-3\frac{1}{2} \times 2\frac{1}{2}-3 \mu$ .



Fig. 11.  
*L. subsimile*.  
Spores,  $\times 870$ ; *a*,  
from type; *b*, from  
Michener specimen  
in Mo. Bot. Gard.  
Herb.

Fructification  $2\frac{1}{2}$  cm. high,  $\frac{1}{2}$  cm. in diameter.  
On ground in woods. New Jersey and Pennsylvania. September.

*L. subsimile* in its dried condition has coloration and general aspect very like *L. semivestitum* but the branches of the former curve rather more apart at the axils and are not as closely appressed above. Only three spores were found in a preparation from the specimen in Curtis Herb., which may be rather immature; these spores are very small in comparison with those of *L. semivestitum*. The specimen distributed in Ell. & Ev., N. Am. Fungi, 2024, under the name *Clavaria velutina* E. & E., without description, and the collection from Pennsylvania, both

of which are cited below as *L. subsimile*, have their spores somewhat rough and may be specifically distinct from this species. Nevertheless I am inclined to regard both collections as the fully mature *L. subsimile*. The type of *L. subsimile* was published as Curtis Herb. No. 4600, which appears to be an error for 4690, the number borne by the specimen to which other data point as the specimen referred to by the description. Ellis notes for his distribution, "Milk white when fresh. Spores white."

Specimens examined:

Exsiccati: Ell. & Ev., N. Am. Fungi, 2024, under the name *Clavaria velutina*.

New Jersey: *Laning*, 49, probable type (in Curtis Herb., 4690);  
Newfield, *J. B. Ellis*, in Ell. & Ev., N. Am. Fungi, 2024.

Pennsylvania: *E. Michener* (in Mo. Bot. Gard. Herb., 56077).

6. *L. cervinum* (Berk. & Curtis) Patouillard, Jour. de Bot. 3: 26. 1888. Plate 5, fig. 9.

*Clavaria cervina* Berk. & Curtis, Linn. Soc. Bot. Jour. 10: 338. 1868; Sacc. Syll. Fung. 6: 716. 1888.—*Clavaria pallida* Berk. & Curtis, Linn. Soc. Bot. Jour. 10: 338. 1868; Sacc. Syll. Fung. 6: 714. 1888.—*Lachnocladium pallidum* (Berk. & Curtis) Patouillard, Jour. de Bot. 3: 26. 1888.

Type: in Kew Herb. and Curtis Herb.

Fructifications coriaceous, branched, becoming tawny olive in the herbarium, hairy with hyaline, thin-walled hairs  $1\frac{1}{2}\mu$  in diameter which protrude  $10\mu$  beyond the basidia and are longer on the stem; branches repeatedly forked, slender, with very acute tips; spores hyaline, even, subglobose,  $3\frac{3}{4}$ – $4\frac{1}{2}\mu$ .

Fructifications 4 cm. high.

On dead wood. Cuba. July.

The type of *C. pallida* is a little more densely branched than that of *C. cervina*, but the specimens are so similar in other respects that they can hardly be regarded as different species. Patouillard published the spores as pale ochraceous, but I find them hyaline as seen with the microscope.

Specimens examined:

Cuba: *C. Wright*, 235, type (in Curtis Herb.); *C. Wright*, 256, type of *Clavaria pallida* (in Curtis Herb.).

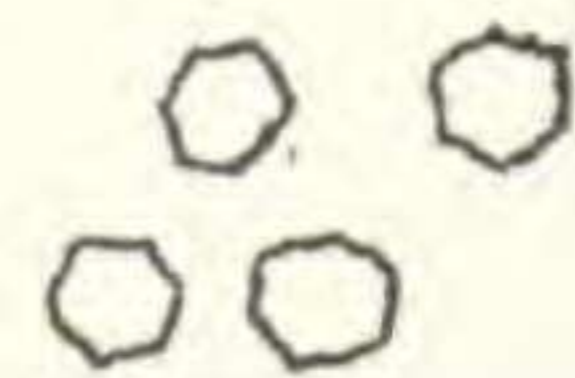


Fig. 12.  
*L. cervinum*.  
Spores,  $\times 870$ .

7. *L. bicolor* (Peck) Burt, n. comb. Plate 5, fig. 6.

*Clavaria bicolor* Peck, N. Y. State Mus. Bul. 54: 954. 1902.  
Not *C. bicolor* Masee, Kew Bul. 1901: 154. 1901.—*C. Peckii*  
Sacc. & D. Sacc. in Sacc. Syll. Fung. 17: 196. 1905.—*C. vestipes*  
Peck, N. Y. State Mus. Bul. 116: 35. 1907.

Type: in N. Y. State Mus. Herb.

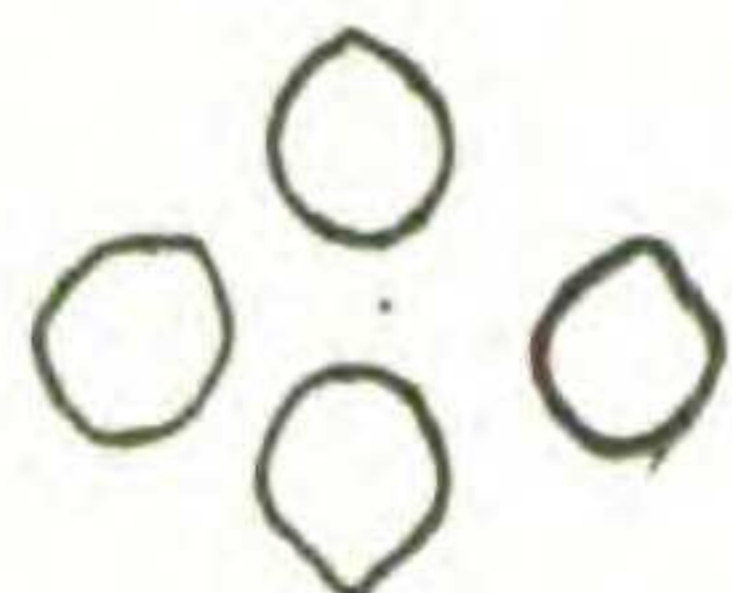


Fig. 13.  
*L. bicolor*.  
Spores,  $\times 870$ .

Fructifications small, 2–2½ cm. high, gregarious; stem slender, 1–2 mm. thick, straight or flexuous, solid, tomentose, pale yellow, divided above into two or more short, orange-colored, compressed branches which are themselves once or twice dichotomously divided; tips acute, concolorous.

Under pine trees. New Hampshire, Massachusetts, and New York. August and September.

The specimens which I have referred to this species are larger in the Massachusetts collection and range from 2½ to 5 cm. high; towards the base the stem is hirsute-tomentose and has dried tawny olive, honey-yellow in the upper portions; the basidia are  $45 \times 8 \mu$ , with two sterigmata; and the spores are hyaline, even, subglobose,  $9\frac{1}{2} \times 8-9 \mu$ . Verification by comparison with the type was overlooked.

Specimens examined:

New Hampshire: Chocorua, *W. G. Farlow* (in Farlow Herb.).

Massachusetts: Coolidge Point, Magnolia, *W. G. Farlow*.

8. *L. furcellatum* (Fries) Léveillé, as understood by Patouillard, Jour. de Bot. 3: 26. pl. 1. f. 3. 1889; Léveillé, Ann. Sci. Nat. Bot. III. 5: 159. 1846 (*Eriocladus*); Sacc. Syll. Fung. 6: 738. 1888; Not of Berk. & Curtis, Linn. Soc. Bot. Jour. 10: 330. 1868. Plate 5, fig. 7.

*Clavaria furcellata* Fries, Linnaea 5: 531. 1830; Epicr. 576. 1838.

Illustrations: Plumier, Filic. Am. pl. 168. f. L. 1705; Patouillard, Jour. de Bot. 3: pl. 1. f. 3. 1889.

Fructifications ascending, somewhat ferruginous, with branches solid, repeatedly dichotomous, distant, rather tough, velvety, acuminate.

Fructifications 7–12 cm. high, pallid ferruginous to ochraceous ferruginous. On rotting wood.

The original description, of which the above is a translation, was based upon collections from Guiana by Roxburgh and Brazil by Beyrich, with reference to the same species of a collection from Bourbon Island by Bory, which differed from the South American specimens by decumbent habit, etc.

At the time of publication of *L. furcellatum*, Fries gave only characters sufficient to distinguish this species from an earlier species, *L. tubulosum*, occurring in the same region and having hollow branches. In the course of time several species of



Fig. 14. *L. furcellatum*. Portion of hymenium showing basidia and a hair, *a*; spores, *s*.  $\times 870$ . From Colombia coll.

South American *Lachnocladium* with solid stems have been recognized, but I have so far failed to find any study upon the original specimens of *Clavaria furcellata* Fries—if these specimens still exist—which gives their microscopical characters and will decide whether *L. furcellatum* as understood by Patouillard or some other *Lachnocladium* with solid branches, is the true *L. furcellatum* (Fries) Lév. The collection from Santa Marta, Colombia, by C. F. Baker, which he distributed under the name *L. brasiliense* upon my determination, I now regard as agreeing more closely with the original description of *L. furcellatum* than

other specimens which I have seen and it has the additional characters published for *L. furcellatum* by Patouillard.

These specimens are tough and certainly coriaceous rather than fleshy, have dried hair-brown below, with final branchlets pinkish buff, everywhere hairy with weak, hyaline hairs  $1\ \mu$  in diameter, which protrude beyond the basidia except along the tips of the branchlets; spores becoming pale ochraceous, even,  $7-12 \times 4\frac{1}{2}-6\ \mu$ , apiculate.

The specimens of *L. furcellatum* of Berk. & Curtis, Fungi Cubenses, are of two species. That collected in Cuba by C. Wright, 831, is *L. brasiliense*; the other by C. Wright, 839, has small hyaline, even spores  $3-4 \times 3\ \mu$  but lacks the radiately branched organs characteristic of *L. brasiliense*.

Specimens examined:

Colombia: Bonda, C. F. Baker, 14, distributed under the name *Lachnocladium brasiliense*.

9. *L. erectum* Burt, n. sp.

Plate 5, fig. 8.

Type: in Ell. & Ev., Fungi Col., 808, copy in Burt Herb.

Fructifications of the type arise in a cluster of three from a common point, soon repeatedly dichotomously branched, with



Fig. 15.  
*L. erectum*.  
Spores,  $\times 870$ .

branches erect, close together, coriaceous, compressed, drying drab, clothed with a gray down whose hyphae are  $50-200\ \mu$  long; fertile tips of the branches cylindric, flexuous, solid,  $\frac{1}{2}-1\ \text{cm.}$  long, bearing the hymenium on all sides; spores very pale yellowish under the microscope, even,  $6-7 \times 3-3\frac{1}{2}\ \mu$ .

Cluster of fructifications 8 cm. high,  $2\frac{1}{2}\ \text{cm.}$  in diameter in the branched portion; individual stems 1 cm. high, about 2 mm. in diameter; branches about 1 mm. in diameter.

On rotten frondose wood. West Virginia. September.

*L. erectum* may be distinguished from the other species of its genus in the eastern United States by occurrence on a woody substratum, by its slender, erect habit of growth and appressed branches, by the soft, downy pubescence of weak hyaline hyphae which stand out at right angles from the stem and branches, and by the small, oblong, apparently slightly colored spores.



## Specimens examined:

Exsiccati: Ell. & Ev., Fungi Col., 808, type distribution under the name *Lachnocladium semivestitum*.

West Virginia: Nuttallburg, *L. W. Nuttall*, in Ell. & Ev., Fungi Col., 808.

**10. *L. Atkinsonii*** Bresadola in Atkinson, Jour. Myc. **8**: 119. 1902; Sacc. Syll. Fung. **17**: 198. 1905.

Type: in Cornell Univ. Herb., 4216.

Fructifications somewhat coriaceous; stem elongated, compressed-canaliculate, pallid, tomentose, 5–6 cm. long, 1 cm. thick, somewhat quadrifid at the apex; branches compressed, sulcate, repeatedly verticillate-, or dichotomo-, divided, tomentose on the sterile side, lurid ochraceous; branchlets somewhat terete, furcate at the apex, straw-yellow; spores hyaline or somewhat straw-colored, even, amygdaliform-oblong or somewhat cylindrical,  $9-10 \times 4\frac{1}{2}-5\frac{1}{2} \mu$ ; basidia clavate.

Dimensions of the branched portion 6–7 cm. high, 5–6 cm. broad. Blowing Rock, North Carolina. August.

A beautiful species approaching the *Clavariae* but included in *Lachnocladium* on account of having the hymenium unilateral and the stem evidently somewhat waxy.

The above is a translation of the original description of this species of which I have seen no specimens.

**11. *L. guadelupense*** (Léveillé) Patouillard, Jour. de Bot. **3**: 33. pl. 1. f. 7. 1889.

*Merisma guadelupense* Léveillé, Ann. Sci. Nat. Bot. III. **5**: 157. 1846.—*Pterula guadalupensis* (Léveillé) Sacc. Syll. Fung. **6**: 742. 1888.

Illustration: Patouillard, *loc. cit.*

Type: in Museum of Paris Herb., according to Léveillé.

Fructification with very short stem, coriaceous, branched; branches very thin, elongated, fastigiate, compressed, dichotomous, becoming fuscous; terminal branchlets very short, naked, acute; spores brown, warted, apiculate at base,  $12 \times 6 \mu$ .

Stem hardly 1 cm. long.

Guadeloupe.

The above description is a translation of the original description with addition of the spore characters as given by Patouillard. Perhaps the species could be transferred to *Thelephora* with advantage on account of the dark spores; I have seen no specimens. Bresadola includes this species in *Pterula*, in Ann. Myc. 14: 233. 1916, and gives *Pterula aurantiaca* P. Henn. and *P. squarrosa* P. Henn. as synonyms.

12. *L. odoratum* Atkinson, Ann. Myc. 6: 58. 1908; Sacc. Syll. Fung. 21: 436. 1912.

Type: in Cornell Univ. Herb., 18618.

"Plants 8 cm. high, bases clustered and covered with white mycelium, branches yellowish or grayish, becoming brownish where bruised, branching several times dichotomously, ultimate branches tapering, branched at very tip to make short acute points, branches faintly tinged lemon-yellow, brownish red at very tip, all of larger branches suffused with a reddish tinge, and here and there laterally tomentose, and sterile. Spores transparent,  $7-10 \times 3\frac{1}{2}-4\frac{1}{2} \mu$ .

"C. U. Herb., No. 18618, growing on very much decayed wood, showing long white cords of mycelium. Connecticut, E. A. White."

The above is the original description. I have seen no authentic specimens but think that they should be compared with *L. Micheneri* and *L. erectum*.

#### EXCLUDED SPECIES

*Pterula setosa* Peck, N. Y. State Mus. Rept. 27: 105. 1875, was transferred to *Lachnocladium* by Sacc. Syll. Fung. 6: 740. 1888. Patouillard in Jour. de Bot. 3: 35. 1888, excluded this species from *Lachnocladium*, because its hairiness is due to the elongated sterigmata of the basidia.

(To be continued.)

## EXPLANATION OF PLATE

## PLATE 5

The figures of this plate have been reproduced natural size from dried herbarium specimens.

Fig. 1. *Lachnocladium brasiliense*. Collected in Cuba by C. Wright, in Curtis Herb.

Fig. 2. *L. cartilagineum*. From the type in Curtis Herb., collected in Cuba by C. Wright, 204.

Fig. 3. *L. Micheneri*. Collected at Newfane, Vermont, by C. D. Howe.

Fig. 4. *L. semivestitum*. From the type in Curtis Herb., collected in Pennsylvania by E. Michener, 1184.

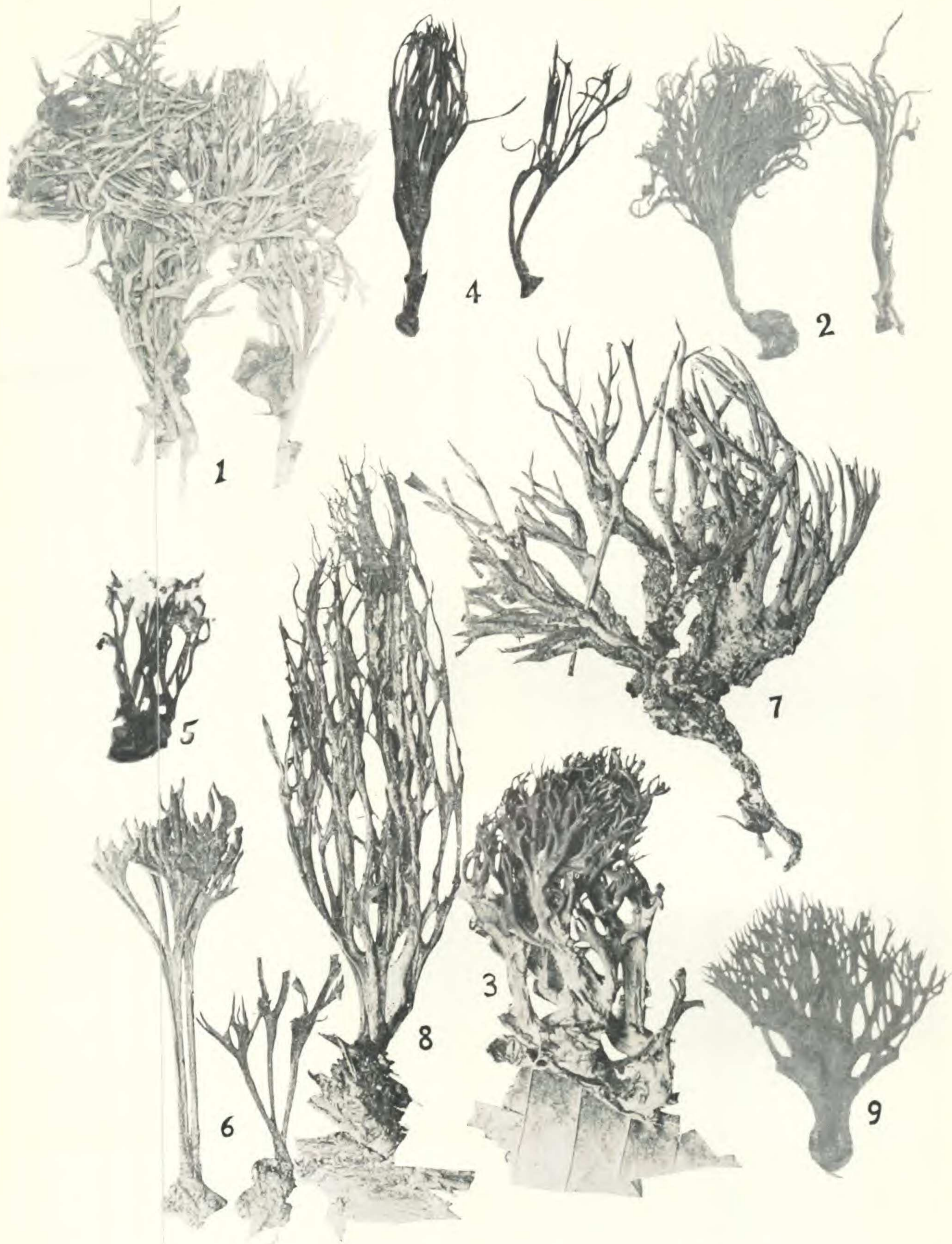
Fig. 5. *L. subsimile*. From the type in Curtis Herb., collected in New Jersey by Laning, 49.

Fig. 6. *L. bicolor*. Collected at Magnolia, Massachusetts, by W. G. Farlow.

Fig. 7. *L. furcellatum*. Collected at Bonda, Colombia, by C. F. Baker, 14.

Fig. 8. *L. erectum*. From the type in Burt Herb., collected at Nuttallburg, West Virginia, by L. W. Nuttall.

Fig. 9. *L. cervinum*. From the type of *Clavaria pallida* in Curtis Herb., collected in Cuba by C. Wright, 256.



BURT—THELEPHORACEAE OF NORTH AMERICA

1. LACHNOCLADIUM BRASILIENSE.—2. L. CARTILAGINEUM.—3. L. MICHENERI.—  
4. L. SEMIVESTITUM.—5. L. SUBSIMILE.—6. L. BICOLOR.—7. L. FURCELLATUM.—  
8. L. ERECTUM.—9. L. CERVINUM.